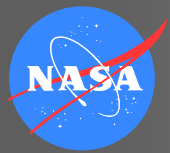


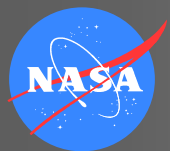
NATIONAL AERONAUTICS  
AND SPACE ADMINISTRATION

# **NASA's Earth Science Data Systems Standards Endorsement Process**

Richard Ullman  
Ming-Hsiang Tsou  
October 25, 2005  
ES-DSWG Baltimore

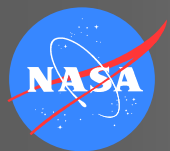


- One initiative after another has stressed the need for interoperability standards.
- Many standards initiatives, both formal and grass roots have put forward or demonstrated various ways to enable “standard” access to data.
- NASA, or NASA funded projects are often in the forefront of these activities.
- Need a way to identify the “standards that work” in the context of NASA’s research and applications data systems.

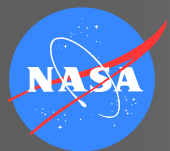


# Standards' Role in Achieving NASA's Earth Science Data Systems Needs.

- Future Data Systems Features (January 2004)
  - Selection and management will emphasize flexibility and accountability over centralization.
  - More distributed geographically, functionally and managerially.
  - Ability to add new data system components, independently developed and independently managed without unduly perturbing existing systems
  - Responsiveness to defined communities: Innovation to serve new community needs encouraged.
  - Services to broad community.
  - Diversity in implementation will be encouraged - with coordination at the interfaces.

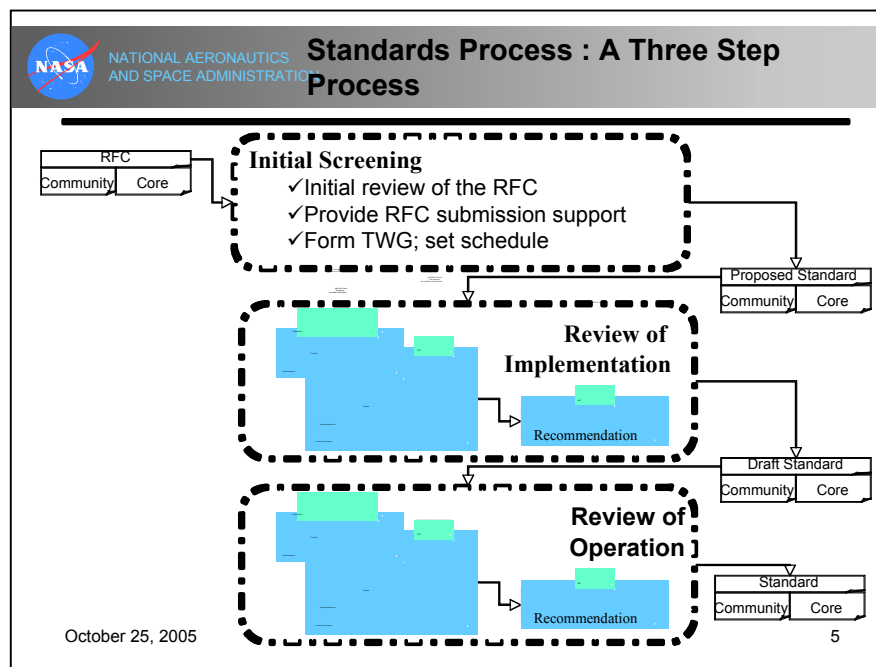


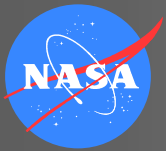
- History: Starting in January 2004, NASA instituted a set of internal working groups to develop ongoing recommendations for evolution of Earth Science Data Systems development and management within NASA. One of these Data Systems Working Groups is called the Standards Process Group.
- Goal: Facilitate broader use of data standards that have proven implementation and operational benefit to NASA Earth science.
- This is a new strategy for standards at NASA:
  - Grass-roots rather than top-down.
  - Only after practices have been shown to (1) have demonstrated implementation and (2) benefit to operation will they be endorsed for preferential use.



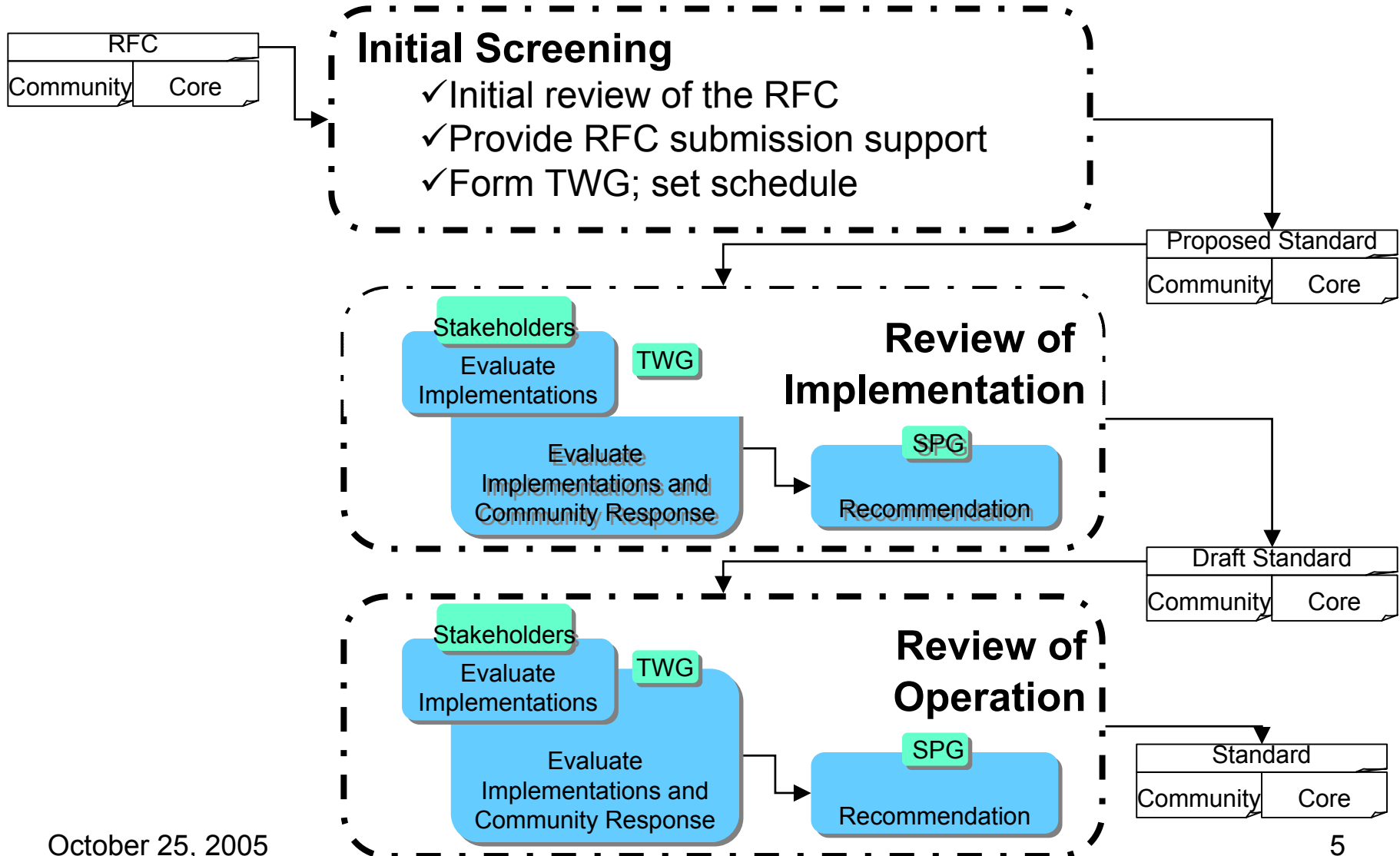
# The Request For Comment Process

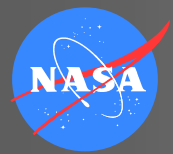
- Proposed standards (RFC's) are submitted by practitioners within the NASA community. These are evaluated in three phases by the SPG and the broader community to assess workability of implementation and success of operation.



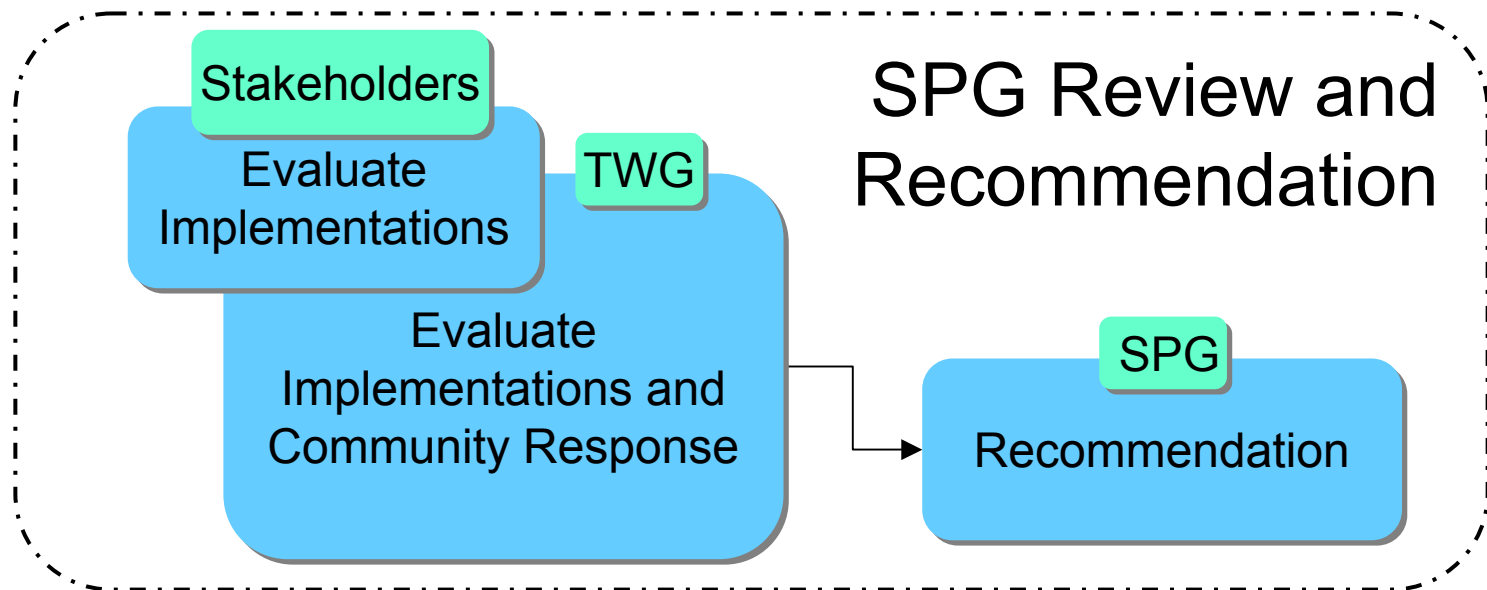


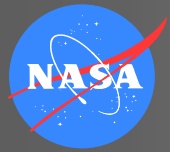
# A Three Step Process





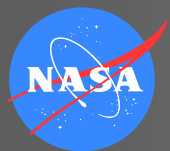
# SPG Review



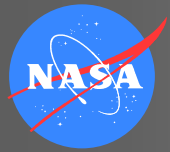


- Community Leader
  - Identify someone in their community who will document standard according to SPG guidelines.
  - Work with the community to get an extended review of the proposed standard.
- SPG
  - Assign “RFC editor” to advise on RFC document.
  - Publish and publicize RFC
  - Assign “TWG”, technical working group to organize community review and evaluate responses.
  - Recommend action to NASA HQ.





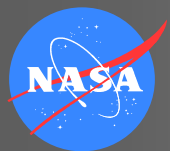
- Any data system practice that increases interoperability or interuse of data within a community or among communities.
  - Standard - Documents Operational Use
  - Tech Note - Builds community awareness; sometimes a precursor to a standard
- Examples:
  - Describe science content (e.g. Content standard for a level-2 precipitation product, surface reflectance product content)
  - Describe interface (e.g. Data Access Protocol, Web Map Server)
  - Describe metadata (e.g. DIF, ECHO)
  - Describe File Format (e.g. HDF, GeoTIFF)
  - Best Practices (e.g. File naming conventions, data management procedures)



## Successful RFCs will have

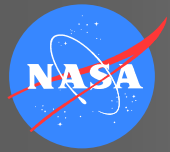
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- At least two implementers.
- Demonstrated operational benefit.
- Strong community leadership to support and use standard
  - Leadership in generating the RFC.
  - Community willing/able to review
- Potential for “impact” and spillover to other communities



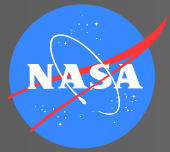
# Benefit of publishing through the SPG

- Benefit to NASA data systems of community endorsement:
  - NASA Earth science data management can rely on standards to achieve highest priority interoperability.
  - Science investigators are assured that standards contribute to science success in their discipline.
- Benefit to community/project that proposes “RFC”
  - Encourage consensus within the community.
  - Grows use of common practices among related activities.
  - Wider discipline community learns from successful practice.
  - Lowers barriers to entry and use of NASA data by external discipline communities within NASA and outside NASA.
- Accelerate “evolution” of practices through better communication.
  - From: successful practice in specific community
  - To: broader community adoption
  - To: community-recognized “standards”

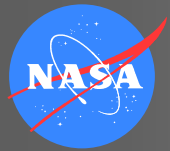


## Words from OpENDAP Group

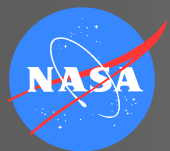
- Excerpt from James Gallagher's (OpENDAP Group):
- A small group cannot develop a high quality specification without external review. The SPG provides a critical service because the process is too expensive for such a group.
- By choosing to vet and publish standards for established technologies, the SPG standards carry extra weight. It is likely they will (continue to) be implemented and adopted.
- Having a high quality document benefits development teams (reducing costs due to errors, miscommunication, et cetera).
- The nature of the standards increase the likelihood of more independent implementation, which will strengthen the individual implementations and lead to high quality (demand-based) improvements.
- Standards are notorious on several levels; this process has gone very smoothly.
- The OPeNDAP Board or Directors singled this activity out as one of the most important for the past year. They felt that the benefits were well worth the (low) costs.



- RFC-004 Data Access Protocol (DAP) 2.0: The SPG reviewed community use of DAP (a.k.a. OPeNDAP) and found that the protocol has multiple interoperable implementations and has demonstrated operational effectiveness. The SPG has recommended that NASA endorse DAP as a community standard.
- RFC-005 Web Map Service Implementation Specification (WMS): The WMS is an Open Geospatial Consortium standard. This RFC makes a case for WMS use by NASA data systems. The RFC is in the Initial Screening stage. We hope to release for Review of Implementation soon.
- HDF: The majority of NASA's Earth remote sensing missions make data available using HDF. What parts or profiles of HDF are appropriate as NASA ESDSWG standard?



- GeoTIFF: Members of the geoTIFF community have expressed a desire to use the NASA process for publication of a standard geoTIFF specification.
- Aura DSWG data product standards: The data systems working group for the Aura mission specification for mission standard products. Publication of this as an RFC will enhance public and scientific use of these products.
- ECHO: NASA's Earth science data metadata clearinghouse has a series of APIs for data providers, client developers and service providers. Publication of these APIs as a specification is proposed as technical notes.



# SPG Breakouts this meeting

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- Presentations Tuesday [1:30 - 5:00]
  - Exploration of Earth science data system community stakeholders practices that might have applicability as a technical note or standard.
- Joint Breakout Wednesday [ 8:30 - 10:00]
  - Joint meeting with Standards, Reuse & Infusion Working Groups
  - Are there common concerns? How can we coordinate? Is there a need for a formal process?
- HDF discussion Wednesday [10:15 - 12:00]
  - what parts of HDF are appropriate as NASA ESDSWG standard?
  - explanation of different HDF versions.
  - profiles as standards or technical notes.
  - what constitutes multiple implementations?
- Process Improvement Thursday [10:15 - 12:00]
  - Improvements, Clarifications, Specific Issues
  - Workshop Wrap up and write report-out.